

CLAIM AMENDMENTS

Claim Amendment Summary

Claims pending

- At time of the Action: Claims 1-35, 37-40, and 42-52.
- After this Response: Claims 1-35, 37-40, and 42-56.

Canceled or Withdrawn claims: none.

Amended claims: 1-6, 13, 19-24, 27, 28, 30, 37, 42-45, and 46-52.

New claims: 53-56.

Claims:

1. (CURRENTLY AMENDED) A method for measuring bandwidth between two entities on a dynamic network, the method comprising:

via a dynamic network, receiving at least ~~one first~~ a pair of non-compressible ~~packet~~ packets having measurable characteristics, the dynamic network being a communications network having no assurance that both packets of a pair of identical packets are handled in an identical manner while in transit on the communications network;

calculating bandwidth based upon, ~~at least partially,~~ measurable characteristics of at least the first pair of non-compressible ~~packet~~ packets.

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Lee & Hayes PLLC, Intellectual Property Law
421 West Riverside, Suite 500, Spokane, WA 99201
509.324-9256 voice | 509.323-8979 fax | www.leeandhayes.com

1 2. (CURRENTLY AMENDED) A method as recited in claim 1, wherein
2 ~~the first~~ each of the pair of non-compressible packet packets is approximately
3 fragmentation-avoidance size.

4
5 3. (CURRENTLY AMENDED) A method as recited in claim 1, wherein
6 ~~the first~~ each of the pair of non-compressible packet packets is highly entropic.

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8 4. (CURRENTLY AMENDED) A method as recited in claim 1, wherein t
9 ~~the first~~ each of the pair of non-compressible packet packets is formatted for TCP.

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11 5. (CURRENTLY AMENDED) A method as recited in claim 1, wherein
12 ~~the first~~ each of the pair of non-compressible packet packets is formatted for UDP.
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421 West Riverside, Suite 500, Spokane, WA 99201
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6. (CURRENTLY AMENDED) A method as recited in claim 1, wherein
further comprising:

~~after receiving the first packet, receiving~~ a second received packet of the
pair non-compressible packet having measurable characteristics including a packet
size (PS) and a time of receipt (t_3);

~~wherein~~ the measurable characteristics of ~~the~~ a first received packet include
a packet size, which is equivalent to the packet size of the second received packet,
and a time of receipt (t_1);

~~wherein~~ a bandwidth (bw) is calculated, during the calculating, by this
formula:

$$bw = \frac{PS}{t_3 - t_1}$$

7. (ORIGINAL) A method as recited in claim 1 further comprising
querying a modem of an entity about a bandwidth setting of the modem when
result of calculating bandwidth is outside a given range of believability.

8. (ORIGINAL) A method as recited in claim 1 further comprising
storing result of calculating bandwidth within a list of recent bandwidth
measurements.

1 9. **(ORIGINAL)** A method as recited in claim 1 further comprising:
2 storing result of calculating bandwidth within a list of recent bandwidth
3 measurements;
4 finding a statistical derivation from such list, such derivation representing a
5 most likely actual bandwidth between the two entities.

6
7 10. **(ORIGINAL)** A method as recited in claim 1 further comprising:
8 storing result of calculating bandwidth within a list of recent bandwidth
9 measurements;
10 finding a median of such list, such median representing a most likely actual
11 bandwidth between the two entities.

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13 11. **(ORIGINAL)** A program module having computer-executable
14 instructions that, when executed within a computing operating environment at an
15 application layer, performs the method as recited in claim 1.

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17 12. **(ORIGINAL)** A computer-readable medium having computer-
18 executable instructions that, when executed by a computer, performs the method
19 as recited in claim 1.

16. (ORIGINAL) A method as recited in claim 13, wherein the first and second non-compressible packets are highly entropic.

17. (ORIGINAL) A method as recited in claim 13, wherein the first and second non-compressible packets are formatted for TCP.

18. (ORIGINAL) A method as recited in claim 13, wherein the first and second non-compressible packets are formatted for UDP.

19. (CURRENTLY AMENDED) A method for measuring bandwidth between two entities on a dynamic network, the method comprising:

via a dynamic network, sending at least one first a pair of non-compressible packet packets, the dynamic network being a communications network having no assurance that both packets of a pair of identical packets are handled in an identical manner while in transit on the communications network;

receiving a bandwidth calculation based upon, ~~at least partially,~~ measurements related to at least the first pair of non-compressible packet packets.

20. (CURRENTLY AMENDED) A method as recited in claim 19, wherein ~~the first~~ each of the pair of non-compressible packet packets is approximately fragmentation-avoidance size.

1 21. (CURRENTLY AMENDED) A method as recited in claim 19, wherein
2 ~~the first~~ each of the pair of non-compressible packet packets is highly entropic.

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4 22. (CURRENTLY AMENDED) A method as recited in claim 19, wherein
5 ~~the first~~ each of the pair of non-compressible packet packets is formatted for TCP.

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7 23. (CURRENTLY AMENDED) A method as recited in claim 19, wherein
8 ~~the first~~ each of the pair of non-compressible packet packets is formatted for UDP.

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10 24. (CURRENTLY AMENDED) A method as recited in claim 19 ~~further~~
11 ~~comprising sending a second non-compressible packet immediately after sending~~
12 ~~the first packet and before receiving a bandwidth calculation, wherein the first and~~
13 ~~second~~ packets of the pair are equivalent in size.

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15 25. (ORIGINAL) A method as recited in claim 19, after the receiving,
16 further comprising:

17 selecting a file formatted for a given bandwidth that is equal to or less than
18 the bandwidth calculation;

19 sending such file.
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1 26. **(ORIGINAL)** A method as recited in claim 19, after the receiving,
2 further comprising:

3 selecting a subfile formatted for a given bandwidth that is equal to or less
4 than the bandwidth calculation;

5 sending such subfile.

6
7 27. **(CURRENTLY AMENDED)** A method as recited in claim 19, before
8 the sending, further comprising selecting ~~the first~~ one of the pair of non-
9 compressible ~~packet~~ packets from a set of differing non-compressible packets.

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11 28. **(CURRENTLY AMENDED)** A method as recited in claim 19, before
12 the sending, further comprising generating ~~the first~~ the pair of non-compressible
13 ~~packet~~ packets.

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Lee & Hayes PLLC, Intellectual Property/Law
421 West Riverside, Suite 500, Spokane, WA 99201
509.324-9256 voice | 509.323-8978 fax | www.leeandhayes.com

1 29. (ORIGINAL) A computer-readable medium having computer-
2 executable instructions that, when executed by a computer, performs the method
3 as recited in claim 19.

4
5 30. (CURRENTLY AMENDED) A method for measuring bandwidth
6 between two entities on a dynamic network, the method comprising:

7 via a dynamic network, sending a first non-compressible packet, the
8 dynamic network being a communications network having no assurance that both
9 packets of a pair of identical packets are handled in an identical manner while in
10 transit on the communications network;

11 via the dynamic network, sending a second non-compressible packet
12 immediately after the sending of the first packet.

13
14 31. (ORIGINAL) A method as recited in claim 30 further comprising
15 receiving a bandwidth calculation based upon measurements related to the first
16 and second non-compressible packets.

17
18 32. (ORIGINAL) A method as recited in claim 30, wherein the first and
19 second non-compressible packets are approximately fragmentation-avoidance size.

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Lee & Hayes PLLC, Intellectual Property Law
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1 33. **(ORIGINAL)** A method as recited in claim 30, wherein the first and
2 second non-compressible packets are highly entropic.

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4 34. **(ORIGINAL)** A method as recited in claim 30, wherein the first and
5 second non-compressible packets are formatted for TCP.

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7 35. **(ORIGINAL)** A method as recited in claim 30, wherein the first and
8 second non-compressible packets are formatted for UDP.

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10 36. **(CANCELED)**

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12 37. **(CURRENTLY AMENDED)** A method of approximating a bandwidth
13 between two entities on a network, the method comprising:

14 generating a list of entries, each entry containing a recent bandwidth
15 measurement;

16 each measurement being based upon a Packet-Pair bandwidth calculation of
17 different pairs of packets, wherein a pair of packets differs from another pair of
18 packets in objectively measurable characteristics.

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20 38. **(ORIGINAL)** A method as recited in claim 37 further comprising
21 replacing a measurement in an entry with a most recently calculated measurement.
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1 39. (ORIGINAL) A method as recited in claim 37, wherein the packets,
2 which are the basis for the Packet-Pair bandwidth calculation, are non-
3 compressible.

4
5 40. (ORIGINAL) A method as recited in claim 37, wherein the packets,
6 which are the basis for the Packet-Pair bandwidth calculation, are highly entropic.

7
8 41. (CANCELED)

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10 42. (CURRENTLY AMENDED) A computer-readable medium having
11 stored thereon a data structure, comprising:

12 a list of entries, each entry being a recent bandwidth measurements;

13 each entry being based upon a Packet-Pair bandwidth calculation of
14 different pairs of packets, wherein a pair of packets differs from another pair of
15 packets in objectively measurable characteristics.

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1 **43. (CURRENTLY AMENDED)** A computer-readable medium having
2 computer-executable instructions that, when executed by a computer, perform a
3 method to measure bandwidth between two entities on a dynamic network, the
4 method comprising:

5 via a dynamic network, receiving a first non-compressible packet and a
6 second non-compressible packet, the dynamic network being a communications
7 network having no assurance that both packets of a pair of identical packets are
8 handled in an identical manner while in transit on the communications network;

9 ~~receiving a second non-compressible packet;~~

10 calculating bandwidth based upon the relative timing of the receiving of the
11 first and second non-compressible packets.

12
13 **44. (CURRENTLY AMENDED)** A computer-readable medium having
14 computer-executable instructions that, when executed by a computer, perform a
15 method to measure bandwidth between two entities on a dynamic network, the
16 method comprising:

17 via a dynamic network, sending a first non-compressible packet, the
18 dynamic network being a communications network having no assurance that both
19 packets of a pair of identical packets are handled in an identical manner while in
20 transit on the communications network;

21 via the dynamic network, sending a second non-compressible packet
22 immediately after the sending of the first packet.

1 45. (CURRENTLY AMENDED) A computer-readable medium having
2 computer-executable instructions that, when executed by a computer, perform a
3 method to approximate a bandwidth between two entities on a network, the
4 method comprising:

5 generating a list of entries, each entry containing a recent bandwidth
6 measurement;

7 each measurement being based upon a Packet-Pair bandwidth calculation of
8 different pairs of packets, wherein a pair of packets differs from another pair of
9 packets in objectively measurable characteristics.
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11 46. (CURRENTLY AMENDED) A modulated data signal having data
12 fields encoded thereon transmitted over a dynamic communications channel,
13 comprising:

14 a first packet containing non-compressible data;

15 a second packet following the first packet, the second packet containing
16 non-compressible data,

17 wherein a dynamic communications channel being a communications
18 network having no assurance that both packets of a pair of identical packets are
19 handled in an identical manner while in transit on the communications network.
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21 47. (CURRENTLY AMENDED) The modulated ~~data signals~~ data signal as
22 recited in claim 46, wherein the first and second packets are approximately
23 fragmentation-avoidance size.
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1 **48. (CURRENTLY AMENDED)** The modulated ~~data signals~~ data signal as
2 recited in claim 46, wherein the first and second packets are highly entropic.

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4 **49. (CURRENTLY AMENDED)** The modulated ~~data signals~~ data signal as
5 recited in claim 46, wherein the first and second packets are formatted for TCP.

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7 **50. (CURRENTLY AMENDED)** The modulated ~~data signals~~ data signal as
8 recited in claim 46, wherein the first and second packets are formatted for UDP.

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10 **51. (CURRENTLY AMENDED)** An apparatus comprising:
11 a processor;
12 a network interface configured to be linked to a dynamic network, the
13 dynamic network being a communications network having no assurance that both
14 packets of a pair of identical packets are handled in an identical manner while in
15 transit on the communications network;

16 a bandwidth measurer executable on the processor to:

17 receive a first non-compressible packet via the network interface
18 linked to a dynamic network, the first non-compressible packet having
19 measurable characteristics;

20 receive a second non-compressible packet via the network interface
21 linked to a dynamic network, the second non-compressible packet having
22 measurable characteristics;

23 calculate bandwidth based upon measurable characteristics of the
24 first and second non-compressible packets.
25

1 52. (CURRENTLY AMENDED) An apparatus comprising:
2 a processor;
3 a network interface configured to be linked to a dynamic network, the
4 dynamic network being a communications network having no assurance that both
5 packets of a pair of identical packets are handled in an identical manner while in
6 transit on the communications network;
7 a bandwidth measurer executable on the processor to:
8 ~~sending a first non-compressible packet;~~
9 ~~sending a second non-compressible packet immediately following~~
10 ~~the sending of the first packet.~~
11 send a first non-compressible via the network interface linked to a
12 dynamic network;
13 via the network interface linked to the dynamic network, send a
14 second non-compressible packet immediately after the first packet is sent.

1 **53. (NEW)** A method as recited in claim 1, wherein the dynamic
2 network is the Internet.

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4 **54. (NEW)** A method as recited in claim 13, wherein the dynamic
5 network is the Internet.

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7 **55. (NEW)** A method as recited in claim 19, wherein the dynamic
8 network is the Internet.

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10 **56. (NEW)** A method as recited in claim 30, wherein the dynamic
11 network is the Internet.

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